# Frankly Speaking

## Today and Tomorrow

TODAY—1942, the nation is investing billions of dollars for *destruction* of the followers of the "Crooked Cross."

Tomorrow—the middle 40's, we shall, most likely, be investing other billions for *construction* of an environment worthy of democratic ideals.

Traffic Engineers would do well to take stock of their individual and Institute assets.

We can attain our full stature as a professional group only by demonstrating our ability to supply practicable solutions to present-day problems and at the same time project our perspective clearly into the problems of the days to come.

Today, our services are sought by those seeking to know the effects of probable shifts from an individual freewheel transportation economy to one of mass transit and motorized military movements. Traffic Engineers are being consulted to form regulations and rules of conduct under blackout conditions for a motor-minded public.

Our knowledge of *Human* Engineering makes us particulrly valuable in organizing the public for effective action on community-wide programs such as staggering of hours, evacuation of vital areas and formulating disaster plans. We have demonstrated, through accomplishment, as *Safety* engineers an ability to mold public opinion and obtain effective action through public relations processes.

Let us not forget or forsake this vital function of safety engineering in which traffic engineering was nurtured. Recently a group of eminent eastern motor vehicle administrators discussed in conference, methods of lessening pedestrian fatalities and injuries without *once* mentioning the word *engineering*. We must not hide our light under a bushel.

Tomorrow, our services will be required within the ranks of *Creative* engineers. Essentially, creative engineering is one of our chief functions as traffic planners. Our duties entail the assemblage, analysis and interpretation of varied data. Creative engineering or planning and design is but the next step.

Trends of the times indicate future emphasis upon rebuilding urban circulation and terminal systems and rehabilitating the obsolete interstices with wholesome housing and its accessory uses in harmony with functional growth.

*Recentralization* of tomorrow will most likely replace in importance the decentralization of today.

Leslie Williams

Editor, Traffic Engineering

VOLUME XII JANUARY, 1942 NUMBER 9

# ANNUAL TRAFFIC REPORT OF DETROIT

*by* D. GRANT MICKLE, *Traffic Engineer*

AS the city ascends the economic spiral, the problem of handling resultant increases in traffic becomes acute.

Many principal arteries of the city have carried traffic beyond the saturation point for a number of years. Obviously, any addition to the existing load must be accommodated on residential or side streets. Traffic counts on a number of streets now acting as relief routes indicate an increase of as much as 100 per cent compared with the traffic volume of four years ago.

Total vehicle miles of travel within the city increased 19 per cent during the past year. The necessity for providing means to handle it has come more rapidly than funds have been made available for facilities to meet the problem.

The Bureau has attempted to alleviate the acuteness of the situation by eliminating parking in certain areas, in an effort to increase street capacity. Better handling of traffic has been achieved through the use of street surface laning and painting and improvements in signing and in signal location.

*Organization.* The organization of the Bureau is made up of four main divisions: signals, signs and markings, accident analysis and graphic presentation (design and drafting). 18 positions have been provided for in the budget as finally approved.

The Committee of greatest importance to the Traffic Engineering Bureau is the Traffic Committee of the City of Detroit.

This Committee, established by City Ordinance, holds regular monthly meetings and special meetings whenever necessary.

Outstanding accomplishments of the Committee have been the traffic plan at Pingree Square; the experiments relative to the merits of fixed time vs. traffic density actuated signals; posting of speeds by proper signing; and recommendation to the Common Council regarding the purchase of parking meters.

*Budget.* Traffic expenditures last year amounted to $159,557. Planned expenditures for the coming year for the improvement of signals and for maintenance and erection of all other traffic control devices amount to $206,444.

*Technical Committee.* Street planning, widenings, condemnations and other projects must be reviewed and approved by a committee appointed by the Mayor; this committee consists of the City Planner, the Commissioner of Public Works, and the Traffic Engineer.

The Traffic Engineer also serves on the Mayor's Committee on Highway Improvements; the Safety and Traffic Committee of the Automobile Club of Michigan; the Traffic Control Committee of the Engineering Society of Detroit.

*Suggestions.* During the period from July 1, 1940 to June 30, 1941, the Traffic Engineering Bureau received 2,526 complaints and suggestions regarding traffic conditions throughout the city.

*Traffic Control Signals.* The efficiency of traffic control signals in moveing traffic depends upon the ability to assign the right-of-way to conflicting traffic movements according to the needs. Three controllers of the most recent type developed which assign right-of-way at any instant upon the basis of the number of cars moving on the green, the number waiting on the red, and the length of time that cars have been waiting, were installed.

Studies show that these self-coordinating traffic density actuated controllers are reducing stops and delays.

Signal lenses facing traffic moving the wrong way on one-way streets were changed from green or amber or constant red to WALK lenses to be illuminated during the normal GO period at the more important pedestrian intersections. This change is proving satisfactory and will be expanded.

Regular inspection of controllers and cleaning of lenses and reflectors was also instigated. Those policies pay dividends in the form of increased average brilliance of signal indication and in a very large reduction in the number of lamp burnouts.

A most important accomplishment with respect to traffic signals was the study of Detroit's traffic signal needs and the preparation of the "Traffic Signal Program" report. The facts indicate the need for a three-fold program: (1) to provide adequate signal visibility, (2) to install signals at unsignalized intersections where needed, and (3) to modernize the traffic signal controllers at existing signalized intersections. Each of these categories was sub-divided into three sub-programs called, "Must," 'Desirable" and "Ultimate."

The analysis of accident records at many signalized intersections confirmed the belief that an unduly large number of rear-end collisions were occurring. The primary reason is the apparent lack of adequate signal visibility due to poor signal location, inadequate number of signal faces, interferences to vision by trucks, buses and streetcars, conflicting neon lights, etc. Overhead mast arm suspended signals are used on all new installations. About 95% of Detroit's traffic signal controllers are outmoded. Furthermore, traffic studies made during the year indicated that controller modernization is also needed to reduce congestion and delay.

Communications from the general public received by phone, by letter, by personal contact, by petition, etc., show definitely that the traffic signal is considered the cure-all for every type of traffic difficulty except parking. Over 98% of all communications emphasize that signals are needed for the sake of safety. In some cases, traffic signals will reduce accidents. In others, they will increase accidents, and have done so. Of the 100 intersections in Detroit where the most accidents were reported in 1940, 85 were controlled by traffic signals. The first 16 worst accident intersections in 1940 all had signals.

A reason often advanced for the need for signals is that school children and pedestrians need protection. Former experience created considerable doubt from the engineering standpoint as to the validity of this reason.

The Public Safety Bureau of the Police Department surveyed school crossings, 10 with school safety patrol, 10 with janitors, 10 with police officers and 10 with traffic signals. During the 28 months commencing with January 1, 1939, twenty-four injury accidents involving children between the ages of 5 and 14 occurred at these forty intersections. The distribution was 3 accidents at crossings with school safety patrols, 4 with janitor control, 5 with officer control and 12 with traffic signals. The injury accidents to children at the 10 signalized intersections equaled the number at the 30 intersections with other types of control. National experience has also indicated that traffic signals are no cure-all for accidents.

If signals will provide more efficient traffic movement, then accident reduction may be expected. If increased efficiency is not to be expected, then accident reduction cannot be expected either.

The primary consideration in the use of traffic signals must be efficient handling of all components of traffic, not safety alone, as the latter is only a normal by-product of the former.

*Signs.* Since 1935, the bulk of the work in the Sign Shop relative to the manufacture of signs, hangers and stanchions has been performed by W. P. A. labor. In addition, this type of labor has been used to augment the regular city employees for sign erection and maintenance crews.

During the fiscal year of 1940-41 the Sign Shop manufactured and installed 7,056 signs on the city streets, of which 6,500 applied to parking signs, 297 stop signs, 259 others consisting of speed limit designations, one-way arrows, turn regulations and miscellaneous other warning and regulatory signs were installed.

During this same period, 3,541 signs were discontinued and removed from the streets consisting for the most part of old type parking devices and approximately 300 stop signs removed from signalized intersections, in accordance with standards contained in the Michigan Manual for Uniform Traffic Control Devices. Pedestrian restraining chains totaling 909 feet were installed during the year.

In addition, the maintenance activities of the Sign Shop included the replacement of 6,033 signs; 1,625 repaired, 21 hand operated semaphores. The Sign Shop contributed 700 poster holders and 10,000 posters for the Pedestrian Protection Campaign.

At the present time, there are 42,058 traffic signs on the streets of Detroit. These signs should be replaced at least once every 4 or 5 years or the purchase of 10,000 new signs per year. Also every traffic sign in the City of Detroit should be washed once per year.

At the present time, Detroit traffic signs are painted by the roller-coat, air-dry method, which is antiquated, laborious and expensive. A study is being made to determine the economics of paint spraying equipment and infrared baking machines. While the present method produces a satisfactory sign so far as appearance is concerned, its life under normal conditions cannot be compared to that of a sign with a baked enamel finish.

All municipalities of the State of Michigan must conform to the "Michigan Manual of Uniform Traffic Control Devices."

"The State Highway Commissioner is hereby authorized to withhold from any township, incorporated village, city or county failing to comply with the provisions of this act, the share of weight and gasoline tax refunds otherwise due such township, incorporated village, city or county; for failure to comply with the Manual."

The Michigan Manual of Uniform Traffic Control Devices contains specifications to be used on all streets and highways in the State of Michigan. These specifications, however, are only general in character, and in order to provide more detailed specifications, the Bureau in the past year compiled the Detroit Sign Manual, which complies with all the State's standards for traffic control devices and which provides the detailed design and installation specifications for each sign to be used on the streets of Detroit.

A survey of the parking signs in the City of Detroit revealed that there were 406 different messages used on these signs and that there were twelve color combinations and six shapes employed in the manufacture of the signs.

A new parking sign was redesigned, rectangular in shape with the longest dimension vertical, and on which two color combinations were used, red letters on a white background to indicate a 24-hour prohibition and green letters on a white background to indicate

part time restrictions. There are six basic messages used on these signs which, with the various time limitations, entail the use of approximately 75 messages.

The new signs contain the words "beyond sign" at the bottom and the restriction applies in the direction of travel and continues to apply to the next sign or the next corner, whichever comes first. In no case, does the message on the front apply to the space in the front of, or the approach side of, the sign. The back of each sign bears a repetition of the message, except that the words "beyond sign" are eliminated.

As in the case of the traffic signal, the stop sign has been too frequently used as a device to attempt to eliminate or reduce accidents.

*Through Streets.* Thorough investigations have shown that in the case of streets having the general physical characteristics as well as traffic characteristics of a through street, stop signs may be employed to bring about an actual reduction in accidents. Conversely, the application of stop signs to control the entrance by traffic to streets lacking the proper physical characteristics and obvious traffic importance, has the effect of increasing the number of accidents and in many instances causing those accidents which do occur to become more serious in their consequences. Stop signs may be installed for one or two purposes.

(1) To designate a street reasonably capable of such designation as a through artery to facilitate rapid movement of vehicular traffic without extraordinary regard for consequential accidents.

(2) To establish officially the right-of-way responsibilities of traffic on a thoroughfare versus those of such traffic about to enter such thoroughfare to effect a reduction of accidents.

In addition to being provided with stop signs, these through streets should also be given preference in the widening and improvement program to further invite their use by through traffic. Such a program would discourage the use of the in-between streets by through traffic and would then leave these streets free for local access purposes only. With such a thought in mind, a plan known as a "preferential street plan" has been adopted.

In preparing this map, full cognizance has been taken of the Master Plan for the streets of Detroit adopted by the City Plan Commission in 1928 and which has since been used as a guide by all City agencies which have to do with the layout, construction, widening and other improvements to the city's streets. The preferential street plan map shows the location of all traffic signals as well as all stop intersections.

This is reflected in a poll conducted by the Detroit Free Press on the question, "Do you think Detroit's one-way streets have helped relieve traffic congestion sufficiently to extend the system?" The answers showed that 78% were in favor of the extension, 14% did not favor the extension and 8% were undecided.

*Markings.* In the spring of 1941 a street paint test was conducted. Previous to this time, it had been the habit to buy paint on the basis of competitive bidding. The lowest bidder received the contract.

Requests were made for samples of paint and 24 such samples were received from various manufacturers. The manufacturers were notified before submitting the samples that certain minimum requirements regarding mean viscosity and drying time must be met and on receipt of the samples, 13 were immediately eliminated from further competition because of their failure to meet these.

The purpose of the test was to determine whether the lowest price paint was the least expensive paint, expressed in the cost of effective mile-days of paint life. The labor cost to paint a mile of five-inch lines, longitudinally on the city streets of Detroit, is approximately $27.40 which is more than three times the cost of the paint.

In other words the paint found to give the greatest number of days of useful life is in the long run the most economical, even though the cost of such paint may be 30% or 40% higher than cheaper paint.

Although this paint test is not yet complete, results obtained thus far show that one sample costing $1.18 per gallon wore out in 43 days. Considering both paint cost and labor cost, the total cost per day of useful life for a mile of 5-inch lines comprised of this paint is $1.14. Another sample submitted which cost $1.40 per gallon, lasted 61 days on the pavement at a cost per day of useful life per mile of only 84c. In other words, this latter paint, costing 22c more per gallon than the first paint, was approximately 25% less expensive than the first paint when both paint and labor costs were considered.

When this paint test has been completed, it is the intent of the Department of Purchases and Supplies to award the contract for the street paint for the coming year to the manufacturer of the sample which produces the lowest cost per day of useful life. In addition, a record has been kept of the traffic volumes through this test section so that it will be possible to determine the exact volume of traffic across a line necessary to completely destroy it. This information will be of considerable value in planning future street painting programs and the ensuing maintenance.

The street painting program undertaken by the Bureau in the spring of 1941 is characterized by a design procedure in which every intersection is subjected to individual field study and analysis rather than the blanket application of so-called standard methods. Approximately 150 intersections have already been studied and the paint layout designed and drawings made for the use of the Traffic Sign Shop paint crews in the original layout of each intersection and the subsequent maintenance paintings. The objective of this street painting program was the accurate delineation of croswalks, stop lines, turn control markings, and the designation of travel lanes and island areas.

Crosswalks on major arteries were redesigned whenever possible so that a right angle crossing would be indicated. Stop lines were located with the intent of minimizing rear end collisions.

At intersections with unusual physical layout, left turn lanes and waiting positions or turning paths are indicated. At all signalized intersections where street painting is warranted, advanced laning is designed for the efficient use of the storage area preceding the stop line. This advance laning, in contrast to the unlaned pavement immediately preceding it, also serves as an advance warning in cases where traffic signals may be improperly located and not readily visible.

All one-way streets have been given full travel lane painting, in order to better organize traffic and thereby increase the efficiency of the roadway surface. Large intersectional areas painted islands are used to delineate the safest movement.

The Bureau is now ready to undertake a program for the installation of permanent pavement markings. These permanent markings are in the form of linoleum rectangles which are applied to the pavement by the use of

an adhesive preparation which holds them there permanently.

A test installation of these markers was made approximately two years ago. At the present time, the lines are still in good condition and show very little wear. It is expected under normal conditions that these pavement markings will have a life of approximately 6 to 8 years and while the original cost is relatively high, it will more than pay for itself in two years.

In December 1940, upon authorization by the Common Council, a program of organized promotion was initiated for the purposes of attempting to correct such behavior on the part of Detroit pedestrians as contributes to their injury and death in collision with vehicular traffic. An appropriation of $6,734.80 was made to be devoted to a 40 weeks program. No fund was asked for or received for the purpose of elaborate promotion because it was thought that beneficial results might come from coordinating and stimulating the safety efforts of the various city departments and private agencies.

A coordinator was appointed and two assistants were employed. An office in Police Headquarters Bldg. was provided and operations started.

Street posters were displayed on hangers attached to city poles at 750 intersections and mid-block locations, with changes of design bi-weekly.

"Watch While You Walk" was stenciled on sidewalks or pavements at 1,000 intersections and supplemented by several thousand spot announcements over the seven local radio stations; a special 15-minute broadcast known as the "Curbstone Quiz" which went on the air Mondays, Wednesdays and Fridays for about two months; hundreds of articles in the metropolitan press, the neighborhood press and the foreign language press, and a printed message from Mayor Edward J. Jeffries, Jr., to all city employees (40,000).

The slogan "Watch While You Walk" was adopted by 50 different concerns in their postage metering machines for display on their envelopes and other mailing pieces. Reproductions of a safety emblem were furnished to all advertising mediums and merchant advertisers.

Participation by chain stores, embracing the display of signs in the stores and on their trucks, and the spoken warning "Watch While You Walk" was used at the close of customer transactions.

In addition there were one hundred poster panels displaying 24-sheet posters, 15,000 signs in all Detroit streetcars and coaches, signs on Department of Public Works and other city-owned vehicles, regular inclusion in the Goodyear motograph on Woodward Ave., 5,000 signs carried on commercial truck fleets, daily reference by Ty Tyson in his baseball broadcasts, use of the public address systems at Briggs Stadium and the Fair Grounds and race track and a 35-foot neon sign installed on the front of City Hall, financed privately.

As of June 30, pedestrian fatalities are slightly below last year, and the ratio of pedestrian fatalities to driver-passenger fatalities has dropped from 80% to 66%, despite greater difficulty in walking due to an increase in bad driving as evidenced by a rise in driver passenger fatalities.

Traffic officers assert that a substantial improvement in mass pedestrian behavior has been noted and observers seem to agree that the campaign is bearing good fruit.

Any sound approach to a traffic program of a city the size of Detroit must take cognizance of the phenomena which has posed the problem.

City development prior to 1920 presupposed the use of mass transportation facilities to bring people in and

out of centralized business and industrial areas. With nearly universal adoption of the automobile for city transportation — both for passengers and commodities — a factor that had not been reckoned with brought on a situation to which we euphemistically refer today as the "traffic problem." Actually, the real problem transcends the safe and facile movement of vehicles; it is inseparably linked with the whole economic and social life of the city.

One of the prime questions facing the Bureau is that of determining the nature and extent of facilities which must be provided to handle traffic of the future. Investigation is being made to learn how mass transportation can be employed to retard decentralizing influences and to learn how effectively rapid transit can conserve the highly crystallized property values already established.

The more immediate problem of the Bureau is to meet present day demands and those of the immediate future. Every effort is being made to install physical controls in order to achieve maximum useage from these existing facilities.

Excerpts from Annual Report, City of Detroit, Traffic Engineering Bureau, July 1940-June 1941.

## HEIGHT AND SIZE OF ROUTE MARKERS

*by* I. T. E. MEMBERS

THE following is a summary of answers received to the question, "Would a traffic engineer be departing from the 'Manual on Uniform Traffic Control Devices' should he raise the height of the U. S. Markers at complex intersections and at places along the main business streets to *approximately 12 feet* and, if necessary to obtain maximum visibility and attraction value, to *increase the size proportionately* possibly to 24 inches?" which was sent to traffic officials including members of the Institute of Traffic Engineers. Fifty replied to the 200 memos sent out on November 1, 1941.

*Size*: 44 stated that the Manual permitted an increase in the size of markers proportionately. 3 felt that to increase the size of markers would be a technical violation of the Manual but all 47 were in agreement that the increase in size would be in the interests of better traffic movement. One did not answer the question of size. One had no opinion and one says increasing the size of markers is a definite departure from the standards set forth in the Uniform Manual on Traffic Control Devices.

*Height*: 45 agreed that signs could be raised to 12 feet and thought this a step in the right direction. 5 of the 45 felt that this would not be in strict accordance with the wording of the Manual but not a departure from its spirit or intent. 4 stated that raising the height of markers above the 8 feet stated in the Manual is a violation and do not recommend a departure from the standards as set forth therein. One had no opinion.

The main objection to raising the height of markers was the feeling that reflectorization would be reduced to a point unsatisfactory to the motorist. Your editor has listed the comments concerning reflectorization for your consideration.

Wilbur S. Smith, Chairman of the Committee on Cooperative Engineering Research will welcome your studied thoughts on this and related matters.

The following are excerpts from the answers received to date:

*General*:

'It is my opinion that this is good, sound engineering practise."

"I do not think it is the intent of

the Manual to set up hard and fast standards that should not be varied if those responsible for moving traffic deem variations necessary."

"These standards are, more or less, minimum requirements."

"I think the traffic engineer would be derelict in his duty did he fail to utilize every facility that his ingenuity could devise to clear up a condition which must lead to congestion, uncertainty, confusion and hazard."

"In making my decision, I am considering that previous efforts to control traffic in accord with the standards of the National Manual have failed."

"I think the Uniform Manual is badly in need of overhauling. If all states and cities would increase the size of signs, I believe accidents would be materially reduced."

"Traffic has changed so much since the last work of the Manual, it is quite obvious that it requires revision."

"It is believed that the Manual itself is not intended to be a rigid set of regulations, but rather a guide to be applied whenever practical to do so in meeting traffic problems. If individual departures from accepted standards become frequent, by reason of traffic necessity then the Manual should be made more flexible."

"It was difficult for any group of men to write a set of regulations that would suit all conditions. I believe there are times when a Traffic Engineer must deviate a little from the uniform rules in order to install a device which he knows to be of value in saving human life and improving traffic conditions."

*Size*

"It was the feeling of the committee that all signs should be increased in size under conditions requiring additional attracting power. The original specifications were that they were to be increased in multiples of 6". This, however, was not aimed so much at the markers originally as at warning and cautionary signs."

*Height*:

"The height of the signs I am sure the committee felt should be adjusted to meet local conditions and the two specific figures they mentioned were largely to be considered as minimums to certain specific conditions."

"U. S. Route Markers installed at approximately 12 feet would be technically in violation of the Manual. I think the Manual is at fault. The traffic engineer is doing the right thing if he does install route markers higher than 8 feet for conditions which so warrant."

"Increasing the height of the stop signal affected a greater obedience to the signal and an increased visibility, therefore, it is my contention that similarly increasing the height of the sign and proportionately increasing its size the visibility of the sign will be increased proportionately."

"There is no question that the greater height would be contrary to the specifications of the Sign Manual. I would definitely not favor the higher mounting on the ground that the signs would be above the range of headlight illumination. At a height of 12 feet they would receive only a small amount of light, and the increased height would almost certainly defeat its own purpose. The City of Washington has recently installed some new car loading zones protected by reflecting arrows on a post at the approach end. It has been noted by drivers that the lower arrow at a height of perhaps 5 feet shows up well while the arrow several feet higher is almost useless. At a height of 12 feet the signs would appear unreasonably high under almost all conditions and would thus be objectionable on general principles. If at usual height they are obscured by trucks, it may be necessary

to restrict parking or, in extreme cases to suspend the signs over the roadway."

*Reflectorization*:

"I have discussed the question with others in the traffic field in this vicinity and found rather general agreement in opposition to the proposal of raising route markers to a height of 12 feet, irrespective of the technical question of whether or not it would deviate from the Manual. The feeling is that this would reduce visibility of these guides at night and also that the deviation would tend to be confusing to strangers for whose guidance the markers are placed."

"We feel that to mount a sign at a 12 foot height is to mount it out of range for 'dark hour' visibility. The sign mounting is governed by the vertical range of light flux that is admitted from the lenses."

"Certainly increasing the height to 12 feet would seriously interfere with its (marker's) effectiveness if reflector buttons are used."

"Increasing the mounting height to 12 feet will result in a loss of illumination from automobile headlights."

"One might, however, question the value of a reflectorized sign at 12 feet."

"The greatest objection to a 12 foot mounting height might be a decrease in efficiency of reflecting elements which depend upon the light from approaching headlights. However, business streets are usually lighted and it is possible that the loss in efficiency of the reflecting elements would be at least in part offset by placing the signs in such a location, that they would receive illumination from normal street lights."

"Careful tests should be made to be sure that higher mounting does not place signs out of range of the illumination of headlights. Perhaps the situation is one which would justify the mounting of signs on mast arms or overhead cables."

"Since oversize signs require oversize reflectors, and since these signs can be read from greater distances which would allow greater spread of headlights, there appears to be no departure from the intent of the Manual even though the wording of it would be definitely violated."

"With the reflector buttons available today, it is my opinion that reflection to a satisfactory degree can be obtained with signs mounted as high as 12 feet. As a matter of fact, reflectorized signs are not of great value on streets that are artificially lighted because the street lights kill the reflection from the buttons."

"We have an installation mounted below a mast arm signal. The signs are extremely visible and I believe with the higher angularity of the reflector buttons which are now being used that even they will be visible at such heights."

"In a city, I am sure some form of illumination can be directed indirectly or directly upon the sign so that the height of same can be raised to whatever the traffic engineer feels is proper."

"On advertising signs, I have seen reflector treatments under headlights that are very effective as far away from the roadway as 150′ and over 40′ above the level of the driver's eye. Reflectors are effective then for traffic signs at any likely elevation above the pavement, whether 12′ or higher; provided the sign is placed to face head-on to the line of approach. With an acceptance angle of 30° the reflected indication will cut off of an approach distance of twice the elevation, i.e., if the sign is 20′ above the pavement, the reflection will cut off at about 40′."

*Here and There*:

Ohio is preparing a State Sign Manual.

Maine plans to relocate and replace route markers through all principal cities during the winter and spring.

Pennsylvania is using a new route marking system.

Oregon uses route markers as large as 30" in size. In most cases, the large markers are placed where competition with other signs practically necessitates the larger size route markers.

Chicago has increased some of their signs in multiples of 6" where truck parking is unusually heavy and depending on the speed, with the height of the sign predicated upon the type of business and kind of traffic which uses the street.

Indiana uses 8" and 14" reflectorized numerals on horizontal rectangles at main rural intersections and in some cities. Also at some busy intersections of multiple lane roads route markers are erected over the pavement with bottom of sign 14' above road and 18" copy on such signs.

New York City found from extensive studies covering a period of two years that in sections where parking is encountered an 11 foot height is used. Insofar as possible, the mixing of the heights is avoided, so that the usual condition on any route is that in the outskirts of the city the markers are the standard height and as the minor business districts are encountered, the 7 foot height to the bottom of the sign is used, and when the central business district is reached, the 11 foot height becomes necessary.

Detroit has found that 24" markers are somewhat oversized except at junctions and turning points. 12" markers are adequate for general purposes. Standard height for placement of route markers is now 12 feet. This is considered a minimum and frequent heights of 17 feet are justified.

Minneapolis uses a sign of size variation to emphasize the conditions involved.

South Bend: stop signs, slow signs, etc., have been increased in size.

Pittsburgh raised its traffic signals to 12'-13' to center of middle lenses on some high speed arteries where numerous rear end collisions were occuring as a result of large trucks obstructing the signals and the accidents were materially reduced.

*Miscellaneous*:

"Stop signs at intersections leading on to main highways in the smaller villages and towns of state of Connecticut were raised to approximately a height of 10 to 12 feet or sufficient so that they could be easily visible above the tops of parked vehicles. In every case where this was done the effective use of the stop sign was unquestionably increased."

"The statement in the Manual that if one dimension of a sign is increased, the other should be increased proportionately *is not entirely workable.* Often the size of the letters on the large sign will control the size of the sign, and it has been our experience that the increase in the width of the sign is not in exact proportion to the height in order to obtain a satisfactory sign. This does not apply to the route markers."

"The Manual should be provided with exceptions to permit lower heights for signs as for example, on traffic island and circles. I mean such signs as 'Keep Right' or arrow signs."

"I wonder if an advance sign with a proper arrow indication would not take care of the difficulty" (truck parking).

"I believe in some instances it may be necessary to duplicate the signs on both sides of the street and erect supplementary signs at turning intersections."

"One final condition is this, that the value of a sign depends only on its yearly maintenance."

*Trends*:

Elimination of the letters U. S. and name of state from markers and devote entire area to numerals.

Stenciling of marker shapes on plates instead of cutting out.

Placing of traffic signs directly over the lane of traffic which they intend to direct. Placed up 14 feet or more on a mast arm.

*New Question*:

What is the value of the word "JUNCTION" above route markers? Would there be a serious departure from the Manual should the word "JUNCTION" be omitted when a marked route is crossed or joined by another route?

*Editor*: Please state your answer briefly with reasons.

## METROPOLITAN TRAFFIC TROUBLES

*by* BURTON W. MARSH

WHILE almost everyone realizes that it is in metropolitan areas that traffic delays and congestion principally occur, relatively little is being done about our metropolitan traffic troubles.

If service is to be given to the major volumes of traffic to anything like the degree to which such traffic pays for service through special motorist taxes, there must be a high degree of concentration on improvement of main highways particularly in metropolitan areas.

Today many a city center is being strangulated. Reduced accessibility because of delays and congestion is one reason. These troubles exist mainly because of lack of arteries for today's needs. Another reason is lack of parking and car storage facilities. Still another is lack of suitable modernized, fast-moving, mass transportation.

At least partly because of these conditions, many businesses are relocating in suburban areas where accessibility is good and ample free or low-cost parking facilities are available. Unfortunately for the central city, these businesses often move outside the municipal limits. Now, taxes from the central business district are of major importance in financing municipal government, constituting in many cases a third or more of the total real estate taxes. Relocation of important businesses outside municipal limits thus has very serious effects on these revenues.

But it goes further than that. There are distinct advantages to being able to do all of one's major shopping within a reasonably small area, and women, who do most of such buying, are greatly interested in this possibility. Hence, if stores where one wants to make purchases are moved away from the central district, it is the shopper's tendency to seek to do *all* her shopping in the new and more convenient business center. Thus additonal businessmen are tempted to relocate. Hence, inconvenience of use of a central district tends to produce an ever-widening spiral of bad effects.

From a military standpoint also, highway transportation problems in metropolitan areas deserve greatly increased attention. Highway transportation has risen to a point of major importance in military operations. In Canada there is said to be one army motor vehicle to every four or five soldiers.

There are various special defense highway needs and not all of them relate to the metropolitan area. Priority in attention must be given to these defense needs, which have recently been the subject of a report by the U .S. Public Roads Administration which has been working with the

Army. While many improvements will be outside of metropolitan areas, a goodly number will be in metropolitan areas.

It is important for convoys and other military movements to be able to pass through metropolitan areas reasonably directly and expeditiously. Much of the busy civilian traffic is engaged in the important business of national defense or in related essential activities. It's not "pleasure traffic" or even unimportant local traffic. And it can't just be ignored; neither should it be neglected. What is needed, of course, is a planned program for maximum efficiency in handling necessary military movements with the least possible detriment to normal traffic.

There are two distinct phases to any program for improvement of highway transportation in cities and their metropolitan areas. The immediate problem is to obtain the maximum efficiency in use of existing facilities. The second longer range phase includes the creation of *new* highway transportation facilities suited to modern traffic needs.

There are four basic requirements for success in any community traffic program:

*Active official leadership.* The chief executive must be convinced that very substantial improvements are essential. He must want results strongly enough to secure the necessary men, materials, and money. He must see that there is continuing coordination and cooperation among officials and government agencies involved.

*Progressive program.* Based on thorough analysis of facts and needs, there must be developed a progressive program of enforcement, engineering, and education. Such a program should be directed to basic needs.

*Proper organization and administration.* Most communities need drastic improvements in organization and administration in order to secure desired results.

*Effective public support and leadership.* Business interests are vitally affected by traffic conditions and various civic groups are greatly interested. Hence, business and civic leaders should help to improve conditions. A way should be found to harness the energy of these groups and to get officials and these other leaders pulling together. In a democracy effective public support for a sound program of action is essential for success.

Within the pattern of these four basic requirements, there are several steps which should be taken in most communities. These are:

*Greatly increase sound traffic enforcement.* Efficient enforcement is the key to the quickest improvement of traffic conditions. The needs include an adequate number of full-time traffic officers (four per 10,000 population is the standard); motorizing most of the traffic police force (minimum 50 per cent, preferred proportion, 75 per cent); investigation of at least 85 per cent of all accidents; *selective enforcement* by emphasis on locations, times, and violations which cause trouble; elimination of fixing; establishment of training and retraining programs; and the establishment of a separate traffic court.

*Institute thorough traffic engineering program.* Every city of over 50,000 population should have an adequate full-time traffic engineering staff, and smaller communities should have access to this service, for example, by district traffic engineers employed by the state. The powers and duties of the traffic engineer should be clearly set forth, preferably by ordinance. Sufficient funds should be provided for an effective program.

*Greatly extend and improve traffic education and training.* There should be programs for sound walking and

bicycling in elementary and junior schools, driver education and training in senior high schools, and effectively designed programs of adult or general public education through every effective medium.

*Set up an effective traffic commission.* A traffic commission made up of officials and key business and civic leaders is the recommended plan for accomplishing the desired results. To be effective, the traffic commission must have a satisfactory working staff. If, as is logical, the traffic commission is expected to take charge of public education, adequate funds must be provided.

*Coordinate traffic plans with adjacent jurisdictions in the metropolitan area.* So far as is practicable, traffic plans of a city should be coordinated with those of other jurisdictions in the metropolitan area.

The above are basic proposals for traffic improvement. If they are carried out, if proper personnel are assigned and given necessary freedom of action, the needed proposals for specific improvements will be developed. Among such specific plans would usually be:

Plans for routing and escorting military convoys and for protecting civilian traffic.

Plans for aiding defense industry activities, as by improved mass transportation; routing plans for workers; adequate emergency parking facilities at or near the plants; safeguards against highway hazards, as at times of shift changes in hours of darkness.

Plans for mass transportation improvements. Improvement in mass transportation reduces congestion on major arteries and in central districts because fewer persons will use private automobiles.

Parking program, including elimination of double parking, elimination of angle parking on all but very wide streets not too heavily used, steps to encourage prompt provision of adequate off-street parking facilities.

Through stop street plan and other traffic routing improvements, these to be made effective both day and night through proper types of signs.

Suitable plans and regulations for loading and unloading to reduce unreasonable congestion.

Modernization and coordination of signal systems. Elimination of unnecessary signals. Use of shortest cycles practicable, with varying cycle lengths for peak and non-peak hours, where needed.

Effective use of lane markings and islands.

Plans for spreading out traffic volume peaks, as by staggering working hours.

*Nature of Future Improvements.* The highway planning surveys show clearly that the major part of the traffic entering the large community is made up not of long-distance through-traveling vehicles, but of local and suburban traffic having destinations in the city center or within the city limits. Large proportions of peak-hour movements in large cities are radial. For this reason it is not adequate to provide by-passes at or near the metropolitan limits, though in some instances studies may indicate that traffic volumes warrant such a by-pass. In general, what is needed by those who will mainly use improved highway facilities in and near cities is a system of express radial highways with certain belt distributors and often a suitable distributing loop at or near the edge of the central business district.

The specific types of highway facilities needed will, in general, be of the express freeway type having the following characteristics: express lanes separated by a central divider strip, no intersections at grade, express lanes protected by an insulating or sterilizing strip against the familiar inter-

ferences (such as parking, loading, turning in and out of abutting properties, pedestrian crossings) which greatly reduce the efficiency of the present city artery, alignment and lane width such that moderately high speed is practicable and safe, accelerating and decelerating lanes at selected distribution points, service roadways entirely separated from express lanes, where needed. Pedestrians and local service vehicles are removed entirely from express lanes.

While there are some important differences in viewpoint as to just what forms express highways should take and even as to their effects, there is a growing belief that only highway facilities of the express type can satisfactorily meet the ever-growing vehicular traffic needs in metropolitan areas. It should be borne in mind that freeways permit greatly increased speeds by express buses, and that they also free surface arteries so that mass transportation thereon can be expedited.

Obviously, any such system of express highways will tremendously increase the need for parking terminals. Hence an integral part of any plan for such an express highway system must be suitable plans for off-street parking facilities.

*Suggested Steps.* The following suggestions may be useful to officials or civic leaders interested in the development of a future program for metropolitan highway transportation. A different order of steps may be desirable, depending upon local conditions.

If there is an active regional or local planning commission or board, consult with its director to learn what has been done and what major steps are next necessary or advisable.

Ascertain from proper authorities what legislation is necessary, as for construction of freeways, for excess condemnation of land for rights-of-way, for the right to acquire needed land for rights-of-way substantially in advance of the time when the improvements actually would be made, for resale of unneeded land taken, for financial aid to cities in securing needed rights-of-way and in construction of express highways.

Consult with your state highway department as to what highway planning survey data are available, to find out if the department is interested in the conduct of a metropolitan highway transportation study and, if so, what the department will do toward financing and cooperating in such a study if invited by local administrators.

Where there is an active state planning commission, consult with it along the same lines as the state highway department.

Consult with the mayor (and other key leaders where necessary) regarding the need for development of such a regional highway transportation plan, and secure his approval and his acceptance of leadership.

Induce the mayor to arrange for a meeting of proper officials (planning, highway engineering, traffic engineering, legislative, legal, and financial) and key business and civic leaders to devise suitable plans for an organization to develop the necessary master plan to do related work. There are many advantages to organizing from the start on a metropolitan or regional basis.

At appropriate times, seek enactment of necessary legislation.

Further steps will depend upon developments, but the importance of selling business, civic, and neighborhood groups and the public at the proper time should be constantly kept in mind.

Condensed from a paper by Burton W. Marsh (Mem. I.T.E.), Director, Safety & Traffic Engineering Division, American Automobile Association, Washington, D. C. Printed in 1940 Public Works Engineers' Yearbook.

# CITIZENS TRAFFIC SAFETY COMMITTEE

*by* A. WALLACE GOVE

THE Citizens Traffic Safety Committee was formed in 1939 at the suggestion of the Mayor of Worcester and with the advice of the National Conservation Bureau. Representatives were obtained from about 40 civic organizations and municipal departments and a strong community leader was induced to take the chairmanship. These have been large factors in the continued success of the committee. Newspaper cooperation has been of vital importance and the organization was fortunate in having a very enthusiastic staff member on the committee from the city's morning paper.

The committee was organized with the following objectives:

"To supplement the excellent traffic work being done by the Worcester Police Department.
To help educate and make traffic conscious those adults, particularly Pedestrians, who are involved in too many traffic accidents.
To assist in establishing sound traffic control methods and procedures.
To coordinate all traffic safety work now under way or proposed."

A very effective safety drive had been inaugurated several months previously by the Police Department. This drive centered about a city-wide 25 mile per hour speed limit and the creation of an Accident Prevention Bureau. As a result of these enforcement activities, accidents were sharply reduced. The results in Worcester soon inspired other communities to inaugurate 25 mile per hour enforcement campaigns.

The continued success of this campaign has hinged upon a strict no-fix policy for arrests for moving traffic violations. In spite of forecasts to the contrary, the public soon became sold on 25 miles per hour as a maximum safe driving speed in the city area.

The general public can now measure the results of the traffic safety program by the size of their pocketbooks, as well as in the decrease in number of injuries and fatalities. Massachusetts compulsory insurance rates for Worcester indicate a savings of $200,000 for the two year period 1941-1942. This saving is on premium payments for personal-injury insurance for passenger cars alone!

At first the Citizens Committee had representatives from only the administrative city departments. Recently its policy was changed to include two members from the legislative body, the chairman of the Aldermanic Police Committee and the Chairman of the Aldermanic Street Committee. This change was instituted to gain a closer cooperation between the official government body and the unofficial citizen group.

Another change has taken place in the Police Department. In each of the five precincts a sergeant has been selected as a staff officer on traffic safety. Meetings are held regularly three times a week at headquarters, with the captain in charge of traffic, the head of the Accident Prevention Bureau and the Manager of the Citizens Traffic Safety Committee. The primary purpose of this organization is to develop a selective enforcement program. These sergeants keep precinct spot maps and work with the captains on the assignment of officers to accident prone locations. They also work closely with the radio cruisers and foot patrolmen to increase their traffic enforcement activity. Inasmuch as the Police Department has full control of all traffic devices, the sergeants are on the

alert to submit to their superiors recommendations for improvement in the facility and safety of traffic. This group of police officials also function on educational activities where the Police Department is involved.

In June 1941 the full-time Traffic Engineer was appointed Manager of the Traffic Safety Committee. Many desirable projects had lagged because they required more time than members could spare from their private positions. These now could be undertaken with greater vigor.

Meetings of the general Citizens Committee are held every three months. A Steering Committee, composed of committee officers, police officials and sub-committee chairmen form this active nucleus. This group meets as the occasion demands — usually once a month. In order to keep all members informed of activities, a monthly newsletter is distributed. Its success is indicated by a request from the school department for 40 extra copies for high school teachers.

In looking to the future the Citizens Traffic Safety Committee has two major references to guide its activities. The first is a traffic survey report recently submitted to the city by a firm of consulting engineers. The second is a review of Worcester's activities and comparison with other cities made by the National Safety Council.

*Summer Pedestrian Campaign.* A rather extensive summer pedestrian educational program was undertaken with weekly features. On the first day the Mayor addressed a letter to all city employees requesting their cooperation and advising that as employees of the city they had the additional responsibility of setting a good example on the highway.

Both local radio stations cooperated by using several plugs on traffic safety daily throughout the summer months. During the first week the largest movie house carried the picture "1-2-3-Go" as part of its program. Eleven hundred theatre passes were issued by the Police Department to newsboys and to children who normally could not afford the price of a movie.

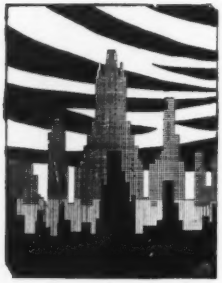
Another week was devoted to playgrounds, featuring instructions by the Police on highway safety. A portable traffic signal was used to demonstrate correct pedestrian practices at intersections. Two of these programs were recorded for broadcast in the evening. The highlight of these programs was the interview of several children who had been injured in traffic.

A series of six broadcasts over a two-week period was made of street interviews. High accident locations were chosen to focus attention on the city's danger spots. Both motorists and pedestrians were challenged to express their views. Another radio program broadcast a meeting of local officials and visiting police and safety officials from Providence, R. I.

One week was devoted to "The Correct Pedestrian." Unposed photographs were taken throughout the city of young and old abiding by traffic regulations. To increase interest, those fortunate enough to have their pictures selected for the daily newspaper feature were given a choice of passes to several of the local theatres.

There were a number of other activities with this summer pedestrian campaign. Crosswalks were painted with the slogan "Look" on all the principal intersections in the business section of the city. Campaign slogans were carried on street car posters and on postal metering machines. In addition the newspapers carried constant publicity on the plans of the committee.

An original article by A. Wallace Gove, Traffic Engineer, Citizens Traffic Safety Committee, Worcester, Mass.



# Stop, Look and Listen

## TIRE ADMINISTRATOR

Mr. T. Elmer Transeau (Mem. I.T.E.), Director of the Bureau of Highway Safety of the Commonwealth of Pennsylvania, has been appointed Tire Rationing Administrator of the state.

Due to the fact that this rationing would have such an important effect on highway safety work and on economic conditions in the automotive industry, Governor James gave serious consideration to the fact that Mr. Transeau has had so many years of experience in administrative work in the field of traffic engineering and highway safety.

## PERSONALS

Henry K. Evans (Jun. I.T.E.) is engaged in some very interesting work as Traffic Project Technician for the Works Project Administration in San Diego and throughout Los Angeles County. Henry was formerly with the Automobile Club of Southern California.

Joseph E. Havenner (Jun. I.T.E.) formerly with the Oregon State Highway Dept. assumed Henry's duties with the Automobile Club of Southern California.

Edward F. Copell, Traffic Engineer of the Massachusetts Department of Public Works, and Ralph W. Eaton, City Traffic Engineer of Providence, Rhode Island, are wrestling with blackout problems.

## CONGRATULATIONS

Virden A. Rittgers (Assoc. I.T.E.) Traffic Engineer, Richmond, Virginia, will take time from his work in Richmond to serve as Consultant on Traffic Control and Safety Equipment to the State and Local Government Requirements Branch of the Priorities Division of O. P. M. in Washington, D. C.

Henry W. Osborne (Assoc. I.TE.) has taken up his new position as Traffic Engineer of the City of Buffalo, N. Y. Buffalo is fortunate in securing the services of a man with the training experience and excellent record of accomplishment which Mr. Osborne has attained. His early training and experience was gained in the City of Milwaukee. Later Mr. Osborne attended both Harvard and Yale Universities to study Traffic Engineering. Following his graduate training he became Traffic Engineer of Flint, Michigan, where he remained doing splendid engineering work when the City of Buffalo sought his advice and services.

## NATIONWIDE ESSAY COMPETITION

*"A Plan of Action to Combat the Rising Tide of Accidents in the Present Emergency"* is the stirring title of a 2,500 word country-wide essay recently announced by the American Museum of Safety in New York City.

Last year, Harry H. Hemmings (Mem. I.T.E.) won this Major Louis L. Wingston Seaman Award for the Promotion of Safety.

This year in addition to the cash awards of $500, $250, and $100 for first, second, and third place winners, is the opportunity to serve your country by promoting safety and conserve man-power for United States war efforts.

Original and practical ideas are awaited by those who are charged with this problem of safety whether in the home, in the factory, on farms or highways.

Set down your thoughts in clear, concise, convincing and conclusive language and forward to Dr. Donald B. Armstrong, Chairman, Seaman Award Committee, American Museum of Safety, Room 733, 60 East 42nd Street, New York City, by *midnight, February 28, 1942.*

Act swiftly and deliberately. Strike back at this menace within our midst undermining the foundations of our defense production.

## TRAFFIC DEFENSE IN SEATTLE

Seattle is fast adjusting itself to wartime conditions. A Defense Traffic Plan and procedure to be followed by traffic during sudden and sustained blackouts have been prepared and tried out. During the four nights, Dec. 8-11, all lights were extinguished from about midnight until 7:30 A.M. All radio stations with the exception of one which was used as the official U. S. Army station were off the air at 7 P.M. Broadcasts were made from this station for assembling of air raid police, traffic signal blackout crews and other pertinent instructions.

The city was divided into 23 districts (each one having from 15 to 20 pieces of electrical equipment to black out), with a captain in each district who had received previous training. Each captain was responsible for the blackout of the equipment in his district.

With the blackouts starting at 11:00 P.M., instructions were given to begin blacking out at 10:15 P.M. and complete the job in 45 minutes.

Instructions were issued for the same crew to turn on the equipment the following morning at 7:30 A.M.

New proposals are:

Connect all electrically illuminated danger lights, island beacons, warning lights, illuminated STOP signs, etc. (of which there are 572) to the multiple system of street lighting; street lighting being controlled by remote control from a central station, in which event in case of blackout the pulling of the switch for street lights will automatically darken all of this electrical equipment *with the exception of traffic signals.*

We are now stringing 21 miles of wire with proper relays, to all traffic signals, bringing the same to a central point.

When this work is completed we intend to install resistance in the signal service line sufficient to reduce illumination from 60% to 70%. Each signal will be hooded thereby preventing overhead visibility, and will not be visible to approaching traffic for a distance of over 60 feet.

An ordinance has been passed, reducing the speed limit during blackouts to 15 miles per hour for civilian traffic and 20 miles for emergency vehicles.

Air raid wardens must be equipped with white caps, belts or gloves to prevent their being killed.

Headlight blackout of civilian vehicles should consist of dark oilcloth, rubber masks or other opaque material, with a horizontal slit 3" long and ½" wide below the center of the headlight; the slit to be covered with dark blue cellophane. The purpose of this slit is for identification only—not for driving illumination. Tail lights, stop lights, and license plate lights must be blacked out with opaque material, leaving a ⅜" circle covered with dark blue cellophane. The rubber mask or other removable mask seems the most practical as they can be installed on a moment's notice. Police and emergency vehicles should have lamps of low intensity, hooded at least 10 inches.

Islands and other fixed objects in the roadway should be painted white as this color is the most visible after the eyes become accustomed to blackouts. If phosphorescent paint can be procured, the outline of islands and other fixed objects in the roadway should be painted with this material. This paint is not only hard to procure but is very costly.

During actual air raids, all vehicles pull to the curb and "stay put."

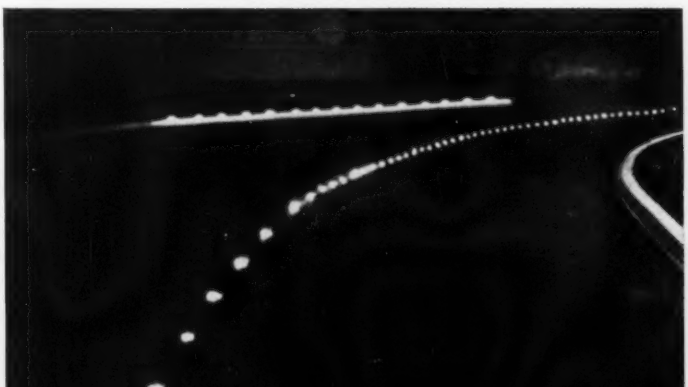
Contributed by J. W. A. Bollong (Mem. I.T.E.), Traffic Engineer, Seattle, Wash.

KEEP 'EM ROLLING
on Safe Highways!

USE CATAPHOTE
REFLECTOR BUTTONS

Army camp areas today have a big responsibility—to keep highways safe for day and night traffic! Engineers find Cataphote Reflector Buttons a great help for this job. These Reflectors show the way to safer motoring at night in center lane markers . . . road-edge delineators . . . and reflectorized STOP, SLOW, CURVE and similar signs. Specify Cataphotes for *permanent reflection and greater safety*. Write for information.

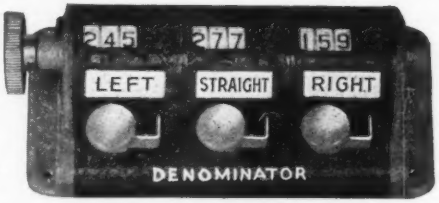
WESTERN CATAPHOTE CORPORATION
TOLEDO, OHIO



*When writing advertisers, please mention* TRAFFIC ENGINEERING

## TRAFFIC COUNTING SIMPLIFIED WITH NEW TRAFFIC COUNT DENOMINATOR

Illustration of 3 unit Counter, classifying directions of travel




Other models with from 1 to 12 classified counting units mounted in horizontal line.

By simply pressing key one count is recorded in classified counting unit controlled by that key.

Touch method employed permitting operator to keep eyes on road at all times.

Quick reset returns all counting units to zero.

Counting units may be classified to represent direction of travel, different types of vehicles, state license plates, and other important classifications in traffic planning.

Now in use by City, County and State Highway Departments throughout the U.S.A.

Quick . . . Accurate . . . Efficient.

— WRITE FOR CATALOGUE —

**THE DENOMINATOR CO., Inc. - 261 Broadway, N. Y. City**


## DO YOU KNOW

Seattle is installing 1600 parking meters and expects that cast-iron will be used in place of non-corrosive materials in the cases.

Philadelphia has $50,000,000 of state funds for street work during the next five years.

An administrative traffic engineering survey has been made for Seattle.

0.85 Lumens per sq. ft. on the pavement is the ideal illumination as far as traffic fatalities are concerned.

Dr. Richard R. Lyman of 587 So. Main St., Salt Lake City, Utah, has developed a street designation system where all "streets which intersect a highway are numbered just the same as houses along a highway are numbered."

The United States has over 3,000,000 of the approximately 10 million miles of highways in the world as of last year.

The Michigan State Land Office Board has deeded to the city of Flint about 2,000 tax-delinquent lots valued at $336,000 to be used for street widenings, openings, small playgrounds, etc.

91.8 per cent of persons entering the business section of Midland, Michigan, do so in automobiles. This is the site of a large defense plant and no intra-city mass transportation facilities.

Bridgeport, Connecticut merchants report that parking meters increased sales in the city center.

Chief Magistrate Henry H. Curran of New York City decided to walk to work after ordering that parking fines be doubled and increased up to $50 unless motorists cleared the streets.

# CROUSE-HINDS

## TRAFFIC SIGNAL BLACKOUT MASK

Illustrated above is the blackout mask for traffic signals recommended by the United States Office of Civilian Defense on page forty-nine in the book titled, "BLACKOUTS."

The mask is made of blackened sheet metal and covers not only the front of the lens but also the edge as well, thus eliminating all stray light from showing around the edge of the lens.

The Crouse-Hinds Company is prepared to furnish standard blackout masks to fit all traffic signals. For information and prices consult Crouse-Hinds Company, Syracuse, New York.

**Crouse-Hinds Company**

Syracuse, New York, U.S.A.

# SODIUM LIGHTS CUT ACCIDENTS

*by* RALPH T. DORSEY

SINCE 1936 when experiments with sodium lighting at hazardous intersections were begun, the city of Los Angeles has installed these orange-yellow high-visibility lights at 200 locations, utilizing 260 units. Most of these sodium lights are installed at crossroads outside the heavily developed sections of Los Angeles, although a number of intersections in commercial and residential areas have the protection afforded by these lights.

Detailed accident data have been kept for twenty of the pioneer sodium lighting installations. This data shows that in the two years before sodium vapor lighting units were installed the total day and night collisions were 106 with 26 occuring in daylight hours and 80 at night. The collisions two years after installation showed that while daylight collisions rose to 34 the night collisions fell to 26. In other words, daylight collisions increased 36% the nighttime collisions decreased 67.5%.

The big night accident reductions have been in the auto versus auto right angle type, the auto versus auto left turn type, and the auto versus fixed object type of collision.

The sodium lights used

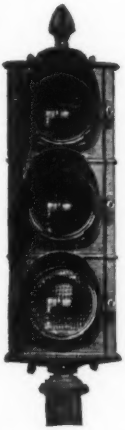
Comparative Collision Chart
20 Intersections
Two Years Before and Two Years After
Installing
Sodium Vapor Safety Lighting Units

Street Traffic Engineering Bureau
Los Angeles Police Department
R.T. Dorsey—Traffic Engineer

Compiled by
W.L. Schroeder

| Types of Collision (Daylight hours / Dark) | Total Collisions Before Safety Lighting | Total Collisions After Safety Lighting | Increase or Decrease | Percent of Increase or Decrease |
|---|---|---|---|---|
| Right Angle Auto vs Auto | 11 / 27 | 14 / 10 | +3 / −17 | +27.2% / −63% |
| Right Angle Auto vs Ped. | 0 / 9 | 1 / 3 | +1 / −6 | +100% / −66.7% |
| Right Turn Auto vs Auto | 1 / 2 | 1 / 0 | — / −2 | — / −100% |
| Right Turn Auto vs Ped. | — / — | 1 / 0 | +1 / — | +100% / — |
| Left Turn Auto vs Auto | 4 / 13 | 11 / 3 | +7 / −10 | +175% / −77% |
| Left Turn Auto vs Ped | — / — | — / — | — / — | — / — |
| Head On Auto vs Auto | 1 / 4 | 1 / 1 | — / −3 | — / −75% |
| Head On Auto vs Ped | — / — | — / — | — / — | — / — |
| Rear End Auto vs Auto | 7 / 10 | 0 / 6 | −7 / −4 | −100% / −40% |
| Side Swipe Auto vs Ped. | — / — | — / — | — / — | — / — |
| Side Swipe Auto vs Auto | 0 / 4 | 1 / 0 | +1 / −4 | +100% / −100% |
| Miscellaneous Auto vs Fixed Object | 1 / 10 | 2 / 2 | +1 / −8 | +100% / −80% |
| Rear End Auto vs Motorcycle | 1 / — | — / — | −1 / — | −100% / — |
| Miscellaneous Motorcycle vs Ped | — / — | — / — | — / — | — / — |
| Miscellaneous Motorcycle Only | — / — | 1 / — | +1 / — | +100% / — |
| Left Turn Auto vs Fixed Object | — / 1 | — / — | — / −1 | — / −100% |
| Miscellaneous Auto Only | — / — | — / 1 | — / +1 | — / +100% |
| Right Turn Auto vs Train | — / — | 1 / — | +1 / — | +100% / — |
| Totals | 26 / 80 | 34 / 26 | +8 / −54 | +36% / −67.5% |

## ELECTRIC SIGNALS



Standard signals adapted for all types of mounting. Synchronous and induction control mechanisms and accessory devices.

## REFLECTOR SIGNALS

When signs are not enough or expense is a factor, reflector signals keep down both cost and accident rate.

8″; Six 1¾″ Stimsonites

15″; Six 3″ Stimsonites

## REFLECTOR SIGNS

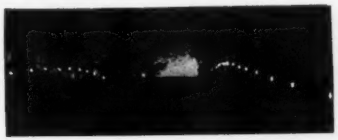
Large Stimsonized and standard reflector button signs for all traffic conditions.

72″ SIGN
18″ LETTERS

24″ SIGN
6″ LETTERS

## DELINEATORS

Reflector Delineation gives essential road information after dark at daylight distances. The alignment and driving limits of the road are outlined by a channel of light.



SIGNAL SERVICE CORPORATION

SS SIGNALS

ELIZABETH, N. J.

TRAFFIC SIGNS
FOR STREETS
HIGHWAYS AND
RAILROADS

STREET NAME SIGNS

AUTOMOBILE LICENSE
PLATES

*Catalog Furnished on Request*

GOPHER STAMP & DIE CO.

CHICAGO & CUSTER

ST. PAUL - - - - MINNESOTA

at these twenty intersections are of a pendant type. These lights each operate a 10,000-lumen sodium lamp in a vertical position and are enclosed in a glass globe. They not only provide a high night visibility but their caution color, orange-yellow, undoubtedly aids in helping the night motorist recognize a danger zone.

Incandescent luminaires, with lamps ranging from 2,500 to 6,000 lumens, previously lighted these twenty intersections now illuminated by the 10,000-lumen sodium lamps. In most cases only one sodium unit is used at an intersection. Twenty-six of these lights are used at the twenty intersections.

During the two-year period in which the lights have been in operation, the cost of night accidents has been reduced to $142,800 at these intersections. This is computed by using the National Safety Council valuations on fatalities, injuries, and city property of $11,500, $425, and $25, respectively.

An original article by Ralph T. Dorsey (Mem. I.T.E.), Traffic Engineer, Los Angeles, California.

## LUMINESCENT MATERIALS

According to a bulletin by a subcommittee of the Civil Defense Research Committee reported in Highway Research Abstracts, November, 1941, the prospect in the field of luminescent materials for road signs and markings is unpromising.

Of the two main types of material only fluorescent paints (those which are only luminous when excited by a sources of energy such as an argon lamp directed on to the surface) can be said to be at all suitable for road signs. The second type—luminescent paints which retransmit energy absorbed from daylight—cannot be depended upon to remain usefully visible for more than about four hours after

sunset on a moonless star-lit night, and they have to be used in letters not less than 12 in. high to be read at a distance of 60 feet. As the fluorescent paints require a source of electric energy, with the attendant expense of cables and current, they seem to have no pronounced advantage over the box type of sign with subdued internal illumination.

For road markings at key points such as pedestrian crossings, on the other hand, lamp-excited fluorescent paints may hold out distinct possibilities. As the paints can be energized from a distance it should be feasible to locate the lamp on the curb or on a bollard and activate a line of fluorescent paint across the carriageway.

Although luminescent materials cannot be used on carriageways for the guidance of vehicular traffic, such signs and markings would be beneficial in guiding pedestrians during the early hours of darkness. If these are of white paint they may be sufficiently visible on many nights in the year. The use of an efficient phosphorescent paint will, however, ensure that the markings are visible on all nights, and most visible on those few really black nights when the greatest difficulty in movement is experienced. As an alternative to paint, phosphorescent plastics in various forms may be used, but precautions may be necessary to prevent thieving. Except on the darkest nights such luminescent markings may continue to show up by reflected light, even after their phosphorescent luminosity has been exhausted. Phosphorescent paints and plastics cannot, however, be made so highly reflective as white paints, and where it is imperative that the markings should be visible throughout the hours of darkness, ordinary white paint should be used.

Phosphorescent materials appear to be particularly suitable for the marking of permanent obstructions.

## UNESSENTIAL

O.P.M. has declared hearses and undertakers vehicles unessential civilian uses. Ambulances are to be pressed into cemetery duty to save on tires. A startled public will soon think nothing of seeing a funeral procession racing crosstown through red lights in hot pursuit of a relative, fleeing "clarilloned" to his last resting place by an absent-minded ambulance driver.

## LOOKING AHEAD

*January 21-23, New York, N. Y.*
Annual Meeting of the American Society of Civil Engineers.

*January 23-24, New York, N. Y.*
Annual Meeting, American Institute of Planners, Hotel Governor Clinton.

*January 27, Detroit, Mich.*
Regional Meeting of the International Association of Chiefs of Police.

*February 18-20, Ann Arbor, Mich.*
Conference on Highway Engineering, Sec. R. L. Morrison (Mem. I.T.E.) University of Michigan, Ann Arbor, Mich.

*February 22-24, New Orleans, La.*
4th Annual Southern Safety Conference, Roosevelt Hotel.

*February 25-27, Philadelphia, Pa.*
Association of Highway Officials of Atlantic States (Benjamin Franklin Hotel). Sec.-Treas. A. Lee Grover, State Highway Dept., Trenton, N. J.

*March 2, Week of—Memphis, Tenn.*
American Road Builders Association. Eng.-Dir., Charles M. Upham, 952 National Press Bldg., Washington, D. C.

*March 3-6, New York, N. Y.*
13th Annual Safety Convention and Exposition, Greater New York Safety Council, Hotel Pennsylvania.

*May (date to be announced later) Indianapolis, Ind.*
National Conference on Planning. Conference Dir., Walter H. Blucher, 1313 E. 60th St., Chicago, Ill.

# SUPER REFLECTORS FOR SUPER HIGHWAYS

Grotelite Delineator Equipped with 3" diameter reflectors. Can be attached to any size angle post

The new Grotelite plastic reflector answers an old reflection problem, i.e., the need for a reflector possessing intense reflecting qualities at extreme angles. This new invention operates upon the principle of total reflection. Light incident upon the device is reflected back to the source through a fairly wide range of angles on one side of direction of approach but through a relatively narrow angular range on the other side. Grotelite reflectors are thus adapted to the actual conditions encountered along the highways.

They offer the distinct advantage in reflecting at great distances while still remaining visible almost up to the time the vehicle passes it. The entire reflecting area returns light even at extreme angles.

A small indicating arrow on the face of each lens points the direction to the road at which the reflectors operate at maximum efficiency. The front faces of the reflectors are smooth.

The delineators illustrated are streamlined and of extremely rugged construction.

Specify Grotelite reflectors for greater performance at minimum cost. Send for catalog.

Grotelite Bridge Signal or Delineator 3" dia. reflector

**MANUFACTURED BY**

## THE GROTELITE CO., INC.

**BELLEVUE, KY.**